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WEATHER OF NORTH AMERICA AND ADJACENT OCEANS.

NORTH ATLANTIC OCEAN.

By F. A. YOUNG.

The average pressure for the month of May was near the normal at all of the land stations on the American and European coasts, as well as in the West Indies and the Bermudas, while it was considerably higher than usual at Horta, Azores.

The number of days on which fog was reported was apparently somewhat less than usual over the Grand Banks and western section of the steamer lanes, while it was slightly above the normal east of the 30th meridian and north of the 45th parallel.

In May there is usually a decrease in the number of days with winds of gale force, as compared with April, and the month under discussion was no exception to the rule, as gales were not reported on more than two days in any 5-degree square.

On the 2d there was a LOW central about 200 miles east of Nantucket that moved slowly eastward and on the 7th reached the coast of Ireland. This disturbance reached its greatest development on May 5, as shown on Chart IX, although the storm area of that day was of limited extent, with winds of maximum force of 9, as shown by following storm logs:

American S. S. Frank A. Morey:

Gale began on the 1st, wind NNW. Lowest barometer, 29.68 inches at 1 a. m. on the 2d; wind NNW.; position, latitude 36° 06' N., longitude 72° 50' W. End of gale on the 2d. Wind NNW. Highest force of wind 9, NNW; steady from NNW.

Dutch S. S. Nieuw Amsterdam:

Gale began on the 1st, wind ENE. Lowest barometer, 29.48 inches at 6 a. m. on the 2d, wind ENE.-7; position, latitude 39° 55' N., longitude 62° 53' W. End of gale on the 2d, wind ENE. Highest force of wind 9, ENE.; steady from ENE.

Dutch S. S. Barendrecht:

Gale began on the 3d, wind SW. Lowest barometer, 29.66 inches at 1 a. m. on the 3d, wind SW., 7; position, latitude 39° 41' N., longitude 50° 19' W. End of gale on the 3d. Highest force of wind, 8, SW; shifts SW.-W.

American S. S. Montana:

Gale began on the 5th, wind WSW. Lowest barometer, 29.45 inches at 9.54 a. m. on the 5th, wind WSW., 9; position, latitude 45° 46' N., longitude 33° 42' W. End of gale on the 6th, wind WNW. Highest force of wind 9, WSW.; shifts WSW.-WNW.

The observer on board the British S. S. *Mauretania* states than on the night of May 5-6 the ship encountered an electric storm at latitude 40° 40' N., longitude 62° W. At first the winds were light and variable, with vivid lightning and heavy thunder and torrential rain. It finished with hard squalls from the WNW. At 5:50 a. m. on the 6th had an exactly similar storm.

On the 6th and 7th light to moderate winds were generally reported between the 25th meridian and the European coast, although the British S. S. *Tranquebar* encountered a strong northwesterly gale on those days, as shown by the following storm log:

Gale began on the 6th, wind W. Lowest barometer, 29.50 inches at 5 p. m. on the 7th, wind WNW.; position, latitude 48° 40' N., longitude 23° 30' W. Highest force of wind 11, WNW.; shifts W.-NW.

Mr. H. Sloman, the observer on the British S. S. *Lapland*, Capt. Bradshaw, reports:

On May 8, G. M. T. 9.25 p. m. or S. A. T. 4:55 p. m. in latitude 40° N.; longitude 64° W., barometer 29.63 inches, dry bulb 64° F., wet bulb

60° F., sea surface temperature 72° F., wind NW. 3, sea slight, with moderate northerly swell, observed two complete waterspouts with others trying to form to northward, distant about 7 or 8 miles. Spouts lasted about 25 minutes and were followed by fresh NNE. wind and rain. The sea was very much disturbed and banked very high at the base of the spouts.

May was evidently an unusually good month for waterspouts, as they were encountered on four other days, as shown by the following extracts from vessel reports.

American S. S. *Glenpool*, Capt. S. Purdy, Second Officer G. Anderson:

At 9:15 a. m., on May 12, while en route from Tampico to New York, three waterspouts were sighted 20 miles S. 15° W. (true) from Diamond Shoals Lightship. They were three points on the port bow, about 1 mile apart, traveling south at a speed of 20 miles an hour and bearing directly for the vessel, so the course was changed to get clear.

American S. S. *F. K. Barstow*, Capt. F. F. Hultgreen, Second Officer J. N. West:

On May 16, in latitude 22° 40' N., longitude 89° 30' W., observed a small waterspout about 1 mile to windward, which appeared to be traveling in a south-easterly direction and approaching the ship rapidly. When about 500 feet away it suddenly turned to the southward, clearing the ship's stern by 20 feet. The movement was from right to left with a column of dense vapor extending up to a low-hanging cloud.

American S. S. *San Blas*, Capt. J. C. Scott, Second Officer S. T. Barr:

On May 17, in latitude 23° 40' N., longitude 82° 30' W., saw three waterspouts, one large and two small, bearing south 2 miles away.

British S. S. *G. R. Crowe*, Capt. R. J. Green, Second Officer H. Chamberlain:

On May 20, latitude 23° 50' N., longitude 86° 40' W., observed eight waterspouts forming and dispersing along the edge of a rain squall in a northeast and northwest direction for a distance of about 6 miles.

From the 8th to the 23d moderate weather prevailed for the most part over the entire ocean, with the Azores High unusually well developed during the greater part of this period. On the 16th westerly gales prevailed over the eastern part of the steamer lanes and on the 23d there was a LOW off the coast of Newfoundland and a limited storm area about 250 miles east of the Virginia Capes.

Storm logs follow:

British S. S. Cornishman:

Gale began on the 15th, wind WNW. Lowest barometer 30.04 inches at noon on the 15th, wind WNW., position, latitude 51° 54' N., longitude 32° 33' W. End of gale on the 16th, wind W. Highest force of wind 8, WNW.; steady from WNW.

American S. S. H. M. Flagler:

Gale began on the 23d, wind WSW. Lowest barometer 29.87 inches at 4 p. m. on the 23d, wind WSW.; position, latitude 37° 18' N., longitude 69° 28' W. End of gale on the 23d, wind WSW. Highest force of wind, 8, WSW.; steady from WSW.

There was a display of the aurora borealis on the nights of the 12th, 13th, 14th, and 15th, being especially brilliant on the night of the 14th and early morning of the 15th. It was observed from vessels in all parts of the steamer lanes and along the American and European coasts, and from the British S. S. *Antillian* in the Gulf of Mexico. The observers on board the British S. S. *Bradford City*, while in the North Seas, and the British S. S. *Welshman*, in latitude 40° 30' N., longitude 49° 49' W. both noticed a large westerly compass deviation in the early morning of the 15th, that could only be accounted for by this phenomenon.

Mr. L. B. Collins, second officer of the American S. S. *Tuscaloosa City*, Capt. A. W. Pratt: Reports that in approximate latitude $40^{\circ} 48' N.$, longitude $54^{\circ} 30' W.$ at about 6 p. m. S. A. T. on the 14th, on a true course of 269° , the temperature of the water was $48^{\circ} F.$, having fallen 11° since 5 p. m.; sea glassy. At 6:15 p. m. crossed into a ruffled surface, and it was observed that two currents existed, one flowing north and the other south. The wake of the vessel was distinctly divided, the smooth surface being carried north and the wake made in the ruffled surface moving south. After being in the ruffled surface for 10 minutes the water temperature had risen to $61^{\circ} F.$, and continued to rise until 8 p. m., when it registered $68^{\circ} F.$

On the 24th there was a moderate disturbance over the western portion of the southern steamer lanes as shown on Chart X. Storm log is as follows:

French S. S. Britannia:

Gale began on the 23d, wind SW. Lowest barometer 29.70 inches at 11 p. m. on the 23d, wind SW., 8; position, latitude $40^{\circ} N.$, longitude $59^{\circ} 40' W.$ End of gale on the 25th, wind NW. Highest force of wind 9; shifts not given.

The observer on the American S. S. *Swiftstar* reports that on the 24th and 25th while between the 82d and 85th meridians near the 24th parallel, encountered a northerly set of current of 15 miles, contrary to chart. Between Sand Key and Alligator Light experienced a strong inshore set, compelling a 7° -change in compass course to overcome same.

The observer on the British S. S. *Corinthic*, reports that on the 25th at latitude $38^{\circ} N.$, longitude $67^{\circ} W.$ observed abnormally large refraction between 8 a. m. and 4 p. m. which caused sights to vary to the extent of 3° longitude. At 10 a. m. air $61^{\circ} F.$, water $62^{\circ} F.$, barometer 30.19 inches, wind ENE., 3; cloudy and dry.

On the 28th there was a Low central near latitude $40^{\circ} N.$, longitude $57^{\circ} W.$, and moderate southerly gales prevailed over a limited area between the 48th and 51st meridians, with comparatively high barometric readings.

On the 29th and 30th there was a slight disturbance of small extent off the coast of Ireland. Storm log follows:

American S. S. Editor:

Gale began on the 29th, wind WNW., 7; lowest barometer 29.60 inches at 4 a. m. on the 30th, wind SW., 7; position, latitude $48^{\circ} 50' N.$, longitude $18^{\circ} 37' W.$ End on the 30th, wind WNW. Highest force of wind 9, WNW.; shifts WNW.-W.-WSW.-NW.

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NORTH PACIFIC OCEAN.

By F. G. TINGLEY.

As determined from observations at the island stations of Dutch Harbor, Honolulu, and Midway Island, pressure over the eastern half of the North Pacific Ocean during May was below normal in middle and low latitudes and above normal in the region bordering the Aleutians. At no time during the month did pressure at the latter two stations equal the normal. At Honolulu the departure was approximately -0.06 inch and at Midway Island -0.14 inch. At Dutch Harbor the departure was $+0.12$ inch, or, by decades, $+0.24$, -0.12 , and $+0.25$ inch.

At the beginning of the month anticyclonic systems covered the region between the Hawaiian Islands and the American mainland and that lying between Midway Island and the western Aleutians. Moderate depressions appeared along the American coast, to the westward of the Hawaiian Islands, and southeast of Japan. By the 4th the anticyclones had merged into one system covering the entire eastern half of the ocean with its crest to the southward of the Gulf of Alaska. The depression to the

southeast of Japan had moved north-northeastward to the region of the Kuril Islands and developed somewhat. During the several days following this date it moved slowly across the Aleutians and Bering Sea and disappeared over Alaska.

Several vessels, eastward bound, were more or less under the influence of this depression for a period of some 10 days. One of these was the Japanese S. S. *Tokushima Maru*, Capt. Shibutani, Yokohama (April 29) for Vancouver. On the 3d and 4th, when in latitude 46° - $47^{\circ} N.$, longitude 160° - $164^{\circ} E.$, this vessel experienced moderate to strong easterly gales.

On the 7th the Japanese S. S. *Arabia Maru*, Capt. K. Komuja, Yokohama (May 1) for Victoria, under the influence of the same depression, had a fresh SE. gale when in latitude $49^{\circ} 11' N.$, longitude $177^{\circ} 40' W.$

While this disturbance was moving slowly east-northeastward from the Kuril Islands two other depressions were forming, one to the northward of the Hawaiian Islands, the other over Japan. During the period from the 8th to the 15th the former moved very slowly in the direction of the British Columbia coast where it merged with another depression then covering the Rocky Mountain region. The Hawaiian Islands depression reached its greatest development on the 12th and 13th in latitude $45^{\circ} N.$, longitude $140^{\circ} W.$ On these dates the Japanese S. S. *Tokushima Maru* and *Arabia Maru*, previously referred to, again experienced fresh to strong easterly gales, being now some few hundreds of miles off the American coast.

The second of these two depressions, forming over Japan during the period from the 7th to the 10th, moved slowly in the direction of Alaska, where it was central on the 23d, thence, in varying formation, southeastward over western Canada and the United States, reaching the Atlantic coast on the 29th.

As in the case of the depression of the 4th, a group of ships sailing from ports in the Orient was under the influence of this disturbance for several days, with this difference, however, that whereas in the case of the earlier storm the vessels were in front of the center and experienced head winds, in the later one they were in the rear of the center and had westerly to northerly winds. These varied generally in force from a fresh breeze to a moderate gale.

Only three vessels reported having seen the aurora borealis, so widely observed on the 14th. These were the Dutch S. S. *Bali*, Capt. C. E. Plugge, in approximately latitude $43^{\circ} N.$, longitude $135^{\circ} W.$, the American S. S. *Hyades*, Capt. E. Pettersen, Observer A. G. Popkin, in latitude $33^{\circ} 18' N.$, longitude $146^{\circ} 44' W.$, and the American S. S. *Manoa*, Capt. E. H. Sandelin, Observer Oliver Bergmann, in latitude $30^{\circ} 42' N.$, longitude $141^{\circ} 05' W.$

Two ships reported having experienced severe earthquake shocks on the 14th.

One of them was the U. S. S. *Cleveland*, Capt. E. T. Consten, U. S. N., commanding. Observer, Lieut. A. E. Schrader, U. S. N. The *Cleveland* was in the harbor of Manzanillo, Mexico, at the time. At 3:10 p. m., local time, there was a severe shock, of 7 to 8 seconds, east to west motion, undulating. At 3:13 p. m. there was a second shock, $1\frac{1}{2}$ to 2 seconds, fairly light.

The other vessel to experience these shocks was the British S. S. *Spectator*, Capt. W. T. Owen, Observer Wm. Squirrell, Panama for San Pedro. At 3:14 p. m. the *Spectator*, in latitude $18^{\circ} 50' N.$, longitude $104^{\circ} 42' W.$ (off Manzanillo), experienced a very violent shock, shaking the ship from stem to stern. Other shocks were felt